We claim:

1. The use of polymers obtainable by free-radical polymerization of

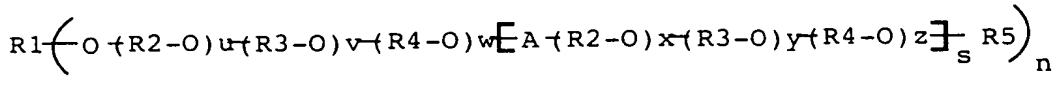
a) at least one vinyl ester of C_1-C_{24}-carboxylic acids in the presence of
b) polyether-containing compounds and
c) optionally one or more other copolymerizable monomers

and subsequent at least partial hydrolysis of the ester functions of the original monomers a), in hair cosmetic formulations.

2. The use of polymers as claimed in claim 1, wherein the polymers are obtainable by free-radical polymerization of

a) at least one vinyl ester of C_1-C_{24}-carboxylic acids in the presence of

b) polyether-containing compounds of the formula I



I

in which the variables independently of one another have the following meanings:

R^1 is hydrogen, C_1-C_{24}-alkyl, R^6-C(=O)-, R^6-NH-C(=O)-, polyalcohol radical;

R^5 is hydrogen, C_1-C_{24}-alkyl, R^6-C(=O)-, R^6-NH-C(=O)-;

R^2 to R^4 are
$-(CH_2)_2-$, $-(CH_2)_3-$, $-(CH_2)_4-$, $-CH_2-CH(R^6)-$, $-CH_2-CHOR^7-CH_2-$;

R^6 is C_1-C_{24}-alkyl;

R^7 is hydrogen, C_1-C_{24}-alkyl, R^6-C(=O)-, R^6-NH-C(=O)-;

A is -C(=O)-O, -C(=O)-B-C(=O)-O, -C(=O)-NH-B-NH-C(=O)-O;

B is $-(CH_2)_t-$, arylene, optionally substituted;

n is from 1 to 1000;

s is from 0 to 1000;

t is from 1 to 12;

u is from 1 to 5000;

v is from 0 to 5000;

w is from 0 to 5000;

x is from 0 to 5000;

y is from 0 to 5000;

z is from 0 to 5000;

and

c) optionally one or more other copolymerizable monomers

and subsequent at least partial hydrolysis of the ester functions of the original monomers a).

3. The use of polymers as claimed in claim 2, wherein the polymers are obtainable by free-radical polymerization of

a) at least one vinyl ester of C_1-C_{24}-carboxylic acids in the presence of

b) polyether-containing compounds of the formula I having an average molecular weight of from 300 to 100000 (number average), in which the variables independently of one another have the following meanings:

R^1 is hydrogen, C_1-C_{12}-alkyl, R^6-C(=O)-, R^6-NH-C(=O)-, polyalcohol radical;

R^5 is hydrogen, C_1-C_{12}-alkyl, R^6-C(=O)-, R^6-NH-C(=O)-;

R^2 to R^4 are
$-(CH_2)_2-$, $-(CH_2)_3-$, $-(CH_2)_4-$, $-CH_2-CH(R^6)-$, $-CH_2-CHOR^7-CH_2-$;

R^6 is C_1-C_{12}-alkyl;

R^7 is hydrogen, C_1-C_{12}-alkyl, R^6-C(=O)-, R^6-NH-C(=O)-;

n is from 1 to 8;

s is 0;

u is from 2 to 2000;

v is from 0 to 2000;

w is from 0 to 2000;

and

c) optionally one or more other copolymerizable monomers

and subsequent at least partial hydrolysis of the ester functions of the original monomers a).

4. The use of polymers as claimed in claim 2, wherein the polymers are obtainable by free-radical polymerizable of

a) at least one vinyl ester of C_1-C_{24}-carboxylic acids in the presence of

b) polyether-containing compounds of the formula I having an average molecular weight of from 500 to 50000 (number average), in which the variables independently of one another have the following meaning:

R^1 is hydrogen, C_1-C_6-alkyl, R^6-C(=O)-, R^6-NH-C(=O)-;

R^5 is hydrogen, C_1-C_6-alkyl, R^6-C(=O)-, R^6-NH-C(=O)-;

R^2 to R^4 are
$-(CH_2)_2-$, $-(CH_2)_3-$, $-(CH_2)_4-$, $-CH_2-CH(R^6)-$, $-CH_2-CHOR^7-CH_2-$;

R^6 is C_1-C_6-alkyl;

R^7 is hydrogen, C_1-C_6-alkyl, R^6-C(=O)-, R^6-NH-C(=O)-;

n is 1;

s is 0;

u is from 5 to 500;

v is from 0 to 500;

w is from 0 to 500;

and

c) optionally at least one or more other copolymerizable monomers

and subsequent at least partial hydrolysis of the ester functions of the original monomers a), in hair cosmetic formulations.

5. The use of polymers as claimed in claim 1, wherein the polymers are obtainable by free-radical polymerization of

a) at least one vinyl ester of C_1-C_{24}-carboxylic acids in the presence of

b) polyether-containing silicone derivatives

and

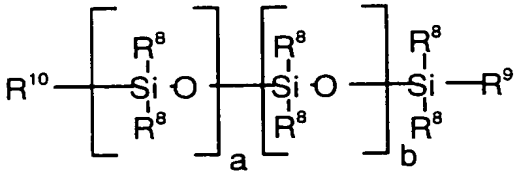
c) optionally one or more other copolymerizable monomers

and subsequent at least partial hydrolysis of the ester function of the original monomers a).

6. The use of polymers as claimed in claim 5, wherein the polymers are obtainable by free-radical polymerization of

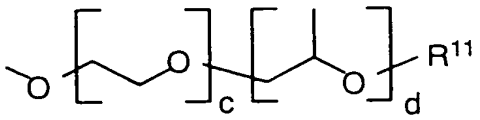
a) at least one vinyl ester of C_1-C_{24}-carboxylic acids in the presence of

b) polyether-containing silicone derivatives of the formula II

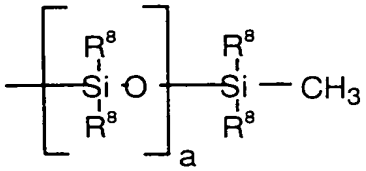


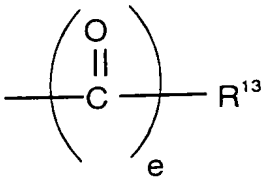
II

where:

R^9 = CH_3 or 

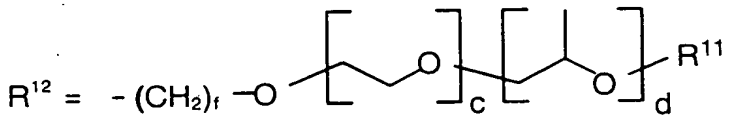
R^{10} = CH_3 or R^9

R^{11} = H, CH_3, 



R^{13} is a C_1-C_{40} organic radical which can contain amino, carboxyl or sulfonate groups, or where e = 0, is also the anion of an inorganic acid,

and where the radicals R^8 can be identical or different, and come either from the group of aliphatic hydrocarbons having from 1 to 20 carbon atoms, are cyclic aliphatic hydrocarbons having from 3 to 20 carbon atoms, are of an aromatic nature or are identical to R^{12}, where:

R^{12} = 

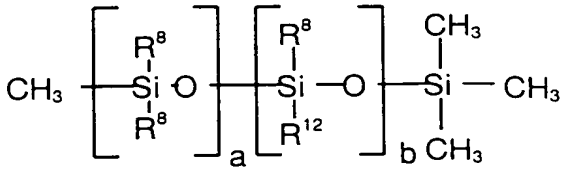
with the proviso that at least one of the radicals R^8, R^9 or R^{10} is a polyalkylene oxide-containing radical as defined above,

and f is an integer from 1 to 6,
a and b are integers such that the molecular weight of the polysiloxane block is between 300 and 30000,
c and d can be integers between 0 and 50, with the proviso that the sum c + d is greater than 0, and e is 0 or 1,

and

optionally one or more other copolymerizable monomers and subsequent at least partial hydrolysis of the ester functions of the original monomers a).

7. The use of polymers as claimed in claim 6, wherein formula II has the following meaning:



8. The use as claimed in claim 1, wherein the polymers are obtainable by free-radical polymerization of

a) at least one vinyl ester of C_1-C_{24}-carboxylic acids in the presence of

b) polyether-containing compounds obtainable by reaction of polyethyleneimines with alkylene oxides

and

c) optionally one or more other copolymerizable monomers

and subsequent at least partial hydrolysis of the ester functions of the original monomers a).

9. The use of polymers as claimed in claim 8, wherein the alkylene oxides used are ethylene oxide, propylene oxide, butylene oxide and mixtures thereof.

10. The use of polymers as claimed in claims 8 and 9, wherein the alkylene oxide used is ethylene oxide.

11. The use of polymers as claimed in claims 8, 9 and 10, wherein the polyethyleneimine has a molecular weight between 300 and 20000.

12. The use of polymers as claimed in claim 1, wherein the polyether-containing compounds b) have been prepared by polymerization of ethylenically unsaturated alkylene oxide-containing monomers and optionally other copolmerizable monomers.

13. The use of polymers as claimed in claim 12, wherein the polyether-containing compounds b) have been prepared by polymerization of polyalkylene oxide vinyl ethers and optionally other copolymerizable monomers.

14. The use of polymers as claimed in claim 12, wherein the polyether-containing compounds b) have been prepared by polymerization of polyalkylene oxide (meth)acrylates and optionally other copolymerizable monomers.

15. The use of polymers as claimed in claims 1 to 14, wherein c) is chosen from the group:

acrylic acid, methacrylic acid, maleic acid, fumaric acid, crotonic acid, maleic anhydride and its half-esters, methyl acrylate, methyl methacrylate, ethyl acrylate, ethyl methacrylate, n-butyl acrylate, n-butyl methacrylate, t-butyl acrylate, t-butyl methacrylate, isobutyl acrylate, isobutyl methacrylate, 2-ethylhexyl acrylate, stearyl acrylate, stearyl methacrylate, N-t-butylacrylamide, N-octylacrylamide, 2-hydroxyethyl acrylate, hydroxypropyl acrylates, 2-hydroxyethyl methacrylate, hydroxypropyl methacrylates, alkylene glycol (meth)acrylates, styrene, unsaturated sulfonic acids such as, for example, acrylamidopropane sulfonic acid, vinyl pyrrolidone, vinyl caprolactam, vinyl ethers, (e.g. methyl, ethyl, butyl or dodecyl vinyl ethers), vinylformamide, vinylmethylacetamide, vinylamine, 1-vinylimidazole, 1-vinyl-2-methylimidazole, N,N-dimethylaminomethyl methacrylate and N-[3-(dimethylamino)propyl]methacrylamide; 3-methyl-1-vinylimidazolium chloride, 3-methyl-1-vinylimidazolium methylsulfate, N,N-dimethylaminoethyl methacrylate, N-[3-(dimethylamino)propyl]methacrylamide quaternized with methyl chloride, methyl sulfate or diethyl sulfate.

16. The use of polymers as claimed in claims 1 and 15, wherein the quantitative ratios are

a) 10 - 90 % by weight
b) 2 - 90 % by weight
c) 0 - 50 % by weight.

17. The use of polymers as claimed in claims 1 to 15, wherein the quantitative ratios are

a) 50 - 97 % by weight

b) 3 - 50 % by weight
c) 0 - 30 % by weight.

18. The use of polymers as claimed in claims 1 to 15, wherein the quantitative ratios are

a) 60 - 97 % by weight
b) 3 - 40 % by weight
c) 0 - 20 % by weight.

19. The use as claimed in claims 1 to 18, where a crosslinking is carried out after the hydrolysis.

20. The use as claimed in claim 19, where the crosslinking is carried out by aldehydes, dialdehydes or borates.

21. A hair cosmetic formulation which has the following composition:

a) 0.05 - 20 % by weight of the polymer as in claim 1
b) 20 - 99.95 % by weight of water and/or alcohol
c) 0 - 79.05 % by weight of other constituents.

22. A hair cosmetic formulation which has the following composition:

a) 0.1 - 10 % by weight of the polymer as in claim 1
b) 20 - 99.9 % by weight of water and/or alcohol
c) 0 - 70 % by weight of a propellant
d) 0 - 20 % by weight of other constituents.

23. A hair cosmetic formulation which has the following composition:

a) 0.1 - 10 % by weight of the polymer as in claim 1
b) 55 - 94.8 % by weight of water and/or alcohol
c) 5 - 20 % by weight of a propellant
d) 0.1 - 5 % by weight of an emulsifier
e) 0 - 10 % by weight of other constituents.

24. A hair cosmetic formulation which has the following composition:

a) 0.1 - 10 % by weight of the polymer as in claim 1
b) 60 - 99.85 % by weight of water and/or alcohol
c) 0.05 - 10 % by weight of a gel former

d) 0 - 20 % by weight of other constituents.

25. A hair cosmetic formulation which has the following composition:

a) 0.05 - 10 % by weight of the polymer as in claim 1,
b) 25 - 94.95 % by weight of water
c) 5 - 50 % by weight of surfactants
d) 0 - 5 % by weight of another conditioning agent
e) 0 - 10 % by weight of other cosmetic constituents.

26. A polymer obtainable by free-radical polymerization of

a) at least one vinyl ester of a C_1-C_{24} carboxylic acid, in the presence of
b) polyether-containing silicone derivatives and
c) optionally one or more other copolymerizable monomers

and subsequent at least partial hydrolysis of the ester functions of the original monomers a).

27. A polymer obtainable by free-radical polymerization of

a) a vinyl ester of a C_1-C_{24} carboxylic acid in the presence of
b) polyether-containing compounds obtainable by reaction of polyethyleneimines with alkylene oxides and
c) optionally one or more other copolymerizable monomers

and subsequent at least partial hydrolysis of the ester functions of the original monomers a).

28. A polymer obtainable by free-radical polymerization of

a) a vinyl ester of a C_1-C_{24} carboxylic acid in the presence of
b) homo- and copolymers of ethylenically unsaturated polyether-containing compounds and
c) optionally one or more other copolymerizable monomers

and subsequent at least partial hydrolysis of the ester functions of the original monomers a).

29. A crosslinked polymer obtainable by free-radical polymerization of

a) at least one vinyl ester of C_1-C_{24} carboxylic acids in the presence of
b) polyether-containing compounds and
c) optionally one or more further copolymerizable monomers

and subsequent at least partial hydrolysis of the ester functions of the original monomers a), where the crosslinker used is either already present during the polymerization, or is added after the polymerization and hydrolysis.

30. A crosslinked polymer as claimed in claim 29, where the crosslinkers used are aldehydes, dialdehydes or borates.

31. The crosslinked polymer as claimed in claim 29, wherein the crosslinker is already present during the polymerization.